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RIGHT OF WAY FOR RAILROADS, AND LOCATIONS THROUGH VILLAGES.

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The "right of way," though not exclusively an engineering consideration, begins to assume so very imposing an appearance in detailed statements of the cost of railways in all parts of the United States, that the following remarks can scarcely be out of place in a Journal open to all discussions, which may tend to advance the cause of internal improvements. A statement of the amount per mile paid by a great number, perhaps a majority, of American railroads would scarcely be believed by the uninitiated, and still more improbable would appear a fair unvarnished account of the system, or rather want of system, which has characterized the manner in which the negotiations for the land have been conducted.

The cost of right of way on the following roads, will be the best illustration of the importance of this subject. These roads are all in this State, or its immediate neighborhood, and very many of the readers of this Journal are able to furnish lists, much more formidable, both as to number of roads as well as cost per mile for right of way.

Long Island railroad, for right of way per mile,	$7000
New Haven and Hartford,	7000
Utica and Schenectady,	4000
Syracuse and Auburn,	3000
Hudson and Berkshire,	2000
Great Western,	1700
Camden and Amboy,	2600
New York and Erie (Eastern terminus,)	2000
" " (Western ")	1000

The right of way on the two first roads on the list, cost as much as (excluding engineering and contingences,) *the graduation, masonry, bridging and superstructure of the Champlain and St. Lawrence railroad* in Low-

er Canada, all of which was done *by the day*, under the immediate direction of the writer of this paper.

In some few instances, as in the case of the Utica and Schenectady railroad the location is so fixed by circumstances that the route is necessarily known to all, but, generally speaking, it will be found that the amount paid, will be great or small, according to the progress which has been made towards a final location at the time of the purchase—thus, it is supposed that the land on the line of the New Haven and Hartford railroad could have been obtained for little or nothing, if the right of way had been secured *before* anything was known of the engineering claims of either route. Again, on the route of the Great Western railroad in Massachusetts it would probably have been as easy to secure a "bonus" for the benefits actually conferred by the road as to pay for the injury inflicted on the inhabitants of that isolated country by cutting up their wilderness with a railway, and connecting them with the western country and two great atlantic cities.

The price paid has also been influenced by the benefits conferred.—The Great Western railroad just referred to, is a case in point. On the New York and Erie railroad, not only the right of way, but donations of land would have been readily granted, *until* the State ordered 10 miles at each terminus to be *immediately* put under contract, when 2000 and 1000 dollars per mile at the eastern and western ends respectively was paid. On the Long Island railroad a farmer between the race course and Jamaica, whilst urging his claim for heavy damages, was negotiating and actually effected the sale of his farm, at an advance of $3000 on its previous value, *because* it was crossed by the railroad. The proprietor of a farm on the Central railroad in Michigan, demanded 13000 dollars for damages, though the roads were previously such as to require half a day to reach Detroit, a distance of 10 miles, whilst by the railroad the property was brought within three quarters of an hour of that city and proportionally increased in value. Of this sum, he received $5000 nearly two years since, and if he has not received the remainder, has certainly very strong claims on the ground that the damages should be in proportion to the benefits conferred by the improvement. The enlargement of the Erie canal will undoubtedly afford some examples worthy of that sublime [or ridiculous ?] project, though damages have as yet found no place in the estimate. It is but fair to state that as interest was excluded, though it will amount to at least ten millions of dollars, it could not be expected that the paltry sum of 3 or 4 millions for damages should be entitled to the honor of a place in the commissioners and engineer's estimate of 1839. The Railroad Journal [August,] page 80, gives an example which shows that, in the interior of Tennessee, the same system of extortion is pursued. The line was located before the releases were obtained and the land derives its value from its proximity to the road, *ergo*—heavy damages to be *paid* instead of free right of way, donations of land for buildings, and liberal subscriptions to the stock *being received*. Exam-

ples abound on almost every road in the Union, but enough have already been quoted.

On the Troy and Ballston, and Cattskill and Canajoharie railroads, the land was obtained for a mere trifle, because the entire arrangement was left to *one* competent agent, who obtained releases *on rival* lines—and in this lies the whole secret. Nothing is more common than a generalpromise of the right of way before the surveys commence, but at the very first glimpse of the stakes, the farmer swears that the route is the very one to which he cannot agree, and that the engineer has devoted his entire skill, science and industry, to do him (the farmer) the greatest possible injury, and if, as sometimes occurs, he should find out that this line has some advantages, he is suddenly beset by a new cause of anxiety—on the one hand he fears to drive the company into another location by demanding too much, on the other side he dreads the very idea of underrating his reasonable claim on them for the privilege of doubling or quadrupling the value of his property by their capital and enterprise. Whilst under the influence of these amiable and generous feelings something may perhaps be done with him—but as soon as he *knows* the route there is an end of all negotiation, and it only remains for the company to submit with resignation to his sheers like their brethren in simplicity, the sheep.

The treating for the right of way has been conducted in various manners, but advantageously only, when entrusted to a single agent. It is well known that the bad locations which, with a few honorable exceptions, characterize the railways of the United States, are in no small degree owing to the want of time to make the requisite surveys, and to institute careful comparisons between rival lines; it is also evident that the information acquired by the engineer in his preliminary surveys is necessary to point out the general direction of the best lines, hence the proper course to be pursued is plainly defined. Some competent person should be authorized by the directors to accompany the engineers, and as their operations show the lines between which the choice lies, he should make himself intimately acquainted with the proprietors, their views and wishes—the grand object being to secure the releases on rival lines *before* the results of the surveys can be known by any, except the principal engineers, and often only very partially by them.

It will be readily observed that the only chance of success is based on the perfect understanding which must exist between this agent and the engineer, and equally indispensible on the part of the former are tact, activity, intelligence—and urbanity of manners. The immense sums paid in various parts of the Union for right of way, are the best arguments to show the propriety of selecting a person in every way qualified, and the absolute necessity of procuring releases in the early stages of the surveys, has been sufficiently alluded to. Where this system has been closely adhered to, as in the cases of the Cattskill and Canajoharie, and Troy and Ballston railroads, it has been attended with signal success, and invariably will be, where-

ever the inhabitants desire to have the railway in their neighborhood though without touching their property, which is the case in nine-tenths of the routes in the country. But the same principle is equally applicable where all are opposed to the railroad "in toto," as with the French farmers in Lower Canada. There the whole arrangement was placed in the hands of a French gentleman of high standing totally unconnected with the railroad, and whilst the farmers received a very liberal compensation, the company were enabled to commence operations without loss of time. Circumstances, however, prevented the possibility of purchasing the ground at the termini for depots, etc., until *after* the opening of the road, and, as the property derived its entire value from the operations of the company the *damages* were in proportion.

The commissioners of the New York water works, state that they have paid $600 per acre, though in many cases the land on steep hill sides was previously of no value. It would, perhaps, be impossible to find another instance of similar prodigality, and the utter want of all the qualifications which have been already enumerated as indispensable in the agent entrusted with this much neglected business. In England 100*l.* per acre is considered a full price for the *purchase* of the land, but here that sum has been paid for the occupation of the land for two years, and in many cases, as the commissioners themselves say, land previously useless is now cultivated. The present line was located in '33, and had the land been then conditionally secured on the rival lines, and before it was known which line would be preferred, it is not unreasonable to suppose that the damages would not have exceeded one-tenth of their present amount. When, however, private companies have been thus neglectful of their *own* interests, it can hardly be expected that men, political agents, should take much trouble to save the money of the public; and indeed, every thing goes to show, that it is a matter of choice with the directors, whether by early and efficient arrangements they shall pay a moderate sum for the right of way, or by procrastination and indecision, pay ten times the value of the land, and thus directly sanction and encourage that wretched spirit of extortion and extravagance which, unless soon checked, bids fair to become as characteristic of the people as of the government.

Lieut. Lecount in his "Treatise on Railways," says, "we have ourselves seen the land for one of the principal railways just constructed, paid for at the enormous sum of 5500*l.* per mile, and another at upwards of 330*l.* an acre, or about 5,600*l.* per mile, under all the circumstances of fraud, delusion, and downright robbery, that can any how be conceived. No means were left untried, no artifices unresorted to, and the most barefaced falsehoods unblushingly set forth, in aid of one vast system of plunder from beginning to end, with hardly any exception. They understand these things better in America. Juries there, have actually awarded, that landholders should compensate railway companies for bringing the line through their lands, whilst in England," etc. I hope Lieut. Lecount will omit the last sentence

in his next edition, and assure his readers, that by changing £ into $ the first part of the extract will apply at least as well on this, as on the other side of the Atlantic, and "with hardly any exception." He is right in stating, that these things are better understood in America, for, whilst in England they obtain exorbitant sums for loss of land, or other *actual* injury, here they receive large amounts because the company confer great value on lands which before were not worth their taxes. Seven thousand dollars per mile bears about the same proportion to the actual value of the land between Hartford and New Haven, that 40,000*l.* per mile does to the value of the land between London and Birmingham; and it is in this way, that they understand things better in America, not excepting her Majesty's Primier of Lower Canada.

I proceed to offer some remarks on the propriety of carrying a railroad *through* a village when it is possible *to pass* on the outskirts.

The only object in desiring a railway through a village, is to enhance for a short time the value of some private property, the owners of which, originally the most clamerous for the location, *after* selling out at an advance, will be the first to discover the *then* "intolerable annoyance" of having their streets traversed by locomotives, at all hours of the day and night. The great objection to such a location is, that the proprietors of the railway are completely in the power of a chamelion of corporation as to velocity and grade, and to some extent as regards the mode of construction.

By passing on the outskirts of a village, the inhabitants will be accommodated to the greatest possible extent, for, as the train stops only at one place, the citizens *generally*, in order to reach the depot, must traverse some distance more or less considerable in proportion to the magnitude of the place; they will consequently be equally well accommodated if the line be placed at this same distance from the main street, and will at the same time avoid all the inconveniences only too well known to those who have a railway close to their doors. A great space is required for buildings, turnouts, etc., for which, if in the village, the most exorbitant prices must be paid, whilst on the outskirts, land may be purchased by the acre and the entire business transacted in a manner much more to the advantage of the company, and of the public—the holders of corner lots always excepted.

It is seldom possible to adopt the most advantageous grades in a village. The rails must be laid so as to offer the least obstruction to waggons, the numerous crossings are as troublesome as they are expensive, and the proper drainage becomes in most cases impracticable. Then, in wet weather, the rails are covered with mud, which, by increasing the resistance of the train, and diminshing the adhesion or power of the engine, adds another difficulty to that often resulting from the unfavorable grade of the street. In winter again, by clearing the track of snow, the streets would be rendered almost impassible from the height of the snow from the railway track and side walks. In all such cases the proprietors of the railway will be fleeced, and by none with greater "*gout*," than by the very persons whose

previous representations induced them to neglect their interest and duty in placing the railway on ground not their own.

Before adopting a line through a street, when not absolutely necessary, the railway should be insured from all liability for damages on account of accidents to persons or cattle, from the expense of keeping the track clear of snow and mud, from the cost of construction and repairs of the *additional* work of the railway, crossings, drains, etc., and, as the danger from fire is well known, the risk should be borne by those who desire to bring into the midst of wooden buildings with shingle roofs, a machine vomiting forth showers of sparks every instant. Even then the millions who will pass over the road will be forever subjected to a loss of time by which incalculable injury will be inflicted on the railway. The trifling difference of 15 minutes in a journey of 150 miles on the Hudson, is sufficient to distance competition, as is known to all who travel on that river. There must be a very strong competition for the western road by the numerors grand thoroughfares which will eventually be made from all the great Atlantic cities to the interior, and speed will be the grand desideratum with *all*, and, however complacently the inhabitants of any one village may regard any unnecessary delay at their own place, they will be found at least as fierce as the western trader or European traveller in decrying the "disgusting delays" at the other 20 or 30 places in which they have no interest.

The interests and independence of the proprietors as well as the proper accommodation and reasonable fare which the public have a right to expect, imperatively require that the right of way should be obtained at a fair expenditure, that the company should be the owners and not the mere tenants of the railroad, and that the depots should if possible be located where the railway can never be controlled by village laws, and where any quantity of land likely to be required may be had at a trifling cost.

In noticing the following extract from the New York Daily Express we feel gratified, not so much with the compliment paid us, as with the spirit of the article, which taking certain facts from our pages as a text, proceeds to remark upon them, and add further information.

Our daily press might do much for the cause of internal improvement, if, starting from dates and numbers, "the most stubborn of facts," judicious comments were made thereon, and the accumulated judgment and information of intelligent men added. Much credit is due to those gentlemen of this city who have fastened public attention to this all important topic, and from time to time have furnished popular views of the most exact results of professional men.

Railroad Receipts.—In the August number of that valuable work, the Railroad Journal, we find it stated, that receipts on the Birmingham railway in England are now at the rate of 700,000*l* sterling, or $3,388,000 per annum. The dense population of England, and the use of railroads for *general transportation*, gives these enormous receipts. On our main lines in the United States the travel on railroads is rapidly on the increase.

The sanguine calculation of the most sanguine, *estimated for income*, the number to pass over "The Eastern Railroad" in Massachusetts at 116,700 for the first year. This period ended the 28th ult., and gave the actual number, 287,000, twice and a half the estimate. The railroads in Massachusetts, that are completed, generally exceed 7 per cent., nett income and are held above par.

The receipts on the Philadelphia, Wilmington and Delaware railroad, for June, July and August, was $127,000, and constantly on the increase.

The following statement of the receipts on the *Syracuse and Utica railroad*, which we understand cost $13,000 per mile for 53 miles, gives 9 per cent., gross in 74 days on the cost of this road:

Ending July 6, (4 days,)	$2 594 41
" 13	5,356 11
" 20	5,854 30
" 27	5,537 15
" Aug. 3	5,300 11
" 10	5,744 87
" 17	5,953 35
" 24	5,444 89
" 31	6,189 42
" Sept. 7	6,330 17
" 14	6,507 37
	$61,312 15

Average per day $840—all for passengers.

We perceive that books are to be opened on the 15th, 16th, and 17th of October, to extend this road to Oswego, on Lake Ontario. This will be a favorite route to the Canadas, the Falls, and to the West. The gain in time and rest to the business man will be great. He sleeps on the North river, dines in Utica, takes tea in Oswego, or on board a fine steamer, and the next morning arrives in Lewistown, in time, if required, to take his breakfast in Buffalo by the railroad now in daily use. All this may be accomplished within forty hours from New York, without fatigue or loosing any rest.

From Syracuse to Auburn, 26 miles there is a very superior railroad completed at an expense of about $18,000 per mile, and doing a good business. Mr. Higham the Engineer in Chief of the Auburn and Rochester railroad, tells us that the entire line is under contract, and will be completed within two years. The Rochester and Tonawanda railroad is completed, and in use 33 miles, to Batavia, leaving a like distance to Buffalo to be completed. This part of the route is in the hands of a company, who have taken steps to procure the requisite funds to complete the only link in the chain from Albany to Buffalo.

The population in our own State tributary to this line—continued through the east parts of Columbia and Dutchess counties to this city—exceeds one million of souls. The day is not distant, when railroad lines will be extended to the Mississippi River, and the number of passengers passing through the valley of the Mohawk will equal 2,500 per day, or say $750,000 for 300 days and yield a gross income of from 7 to $10,000,000 per annum at $12 fare from the city of New York to Buffalo, particularly if the State will allow this line to carry freight free of canal tolls.

BUILDING MATERIAL.—The sound sense displayed in the following article from the New York American, induces us to give it place although

treating of a topic of rather local interest. It is undoubtedly the case that too little attention is paid, in general, to the time enduring properties of the stone used in the construction of our public buildings. No one doubts the picturesque effect of broken cornices and time worn ornaments, but we prefer admiring the buildings of the present day in the perfection of uninjured sharpness of outline, leaving it to the next generation to contemplate them as beautiful ruins.

TRINITY CHURCH.

MR. EDITOR.—Understanding that it is in contemplation to rebuild Trinity Church with the red sandstone, permit me to call the attention of those concerned to a few remarks, in addition to those submitted through your columns a short time ago.

I take it for granted that the Church is now to be built in such a manner as not to need re-construction for at least a few centuries; and there is no good reason why it may not last one thousand as well as one hundred years. To insure this result, attention must be paid to the material employed in its construction. "In passing through the chief towns of Great Britain," says De la Beche, "it will easily be seen, that if more attention were paid to the mineralogical character of the stone employed in the construction of the buildings that frequent decay or decomposition even in those erected within a few years, which we so often observe, would be avoided, at comparatively small cost; and we should find fewer of our public edifices losing all traces of the finer work of their original structure. The number of cathedrals and other public buildings mouldering away externally, from inattention to the quality of the stone employed in them, is far greater than might be anticipated by those who have not directed their attention to the subject. Building materials for cathedrals, churches, abbeys, castles and the public edifices of towns, can scarcely in general be said to have been selected, except probably by the Normans; stone having been usually taken from the nearest quarry, provided it had a tolerable appearance, and was readily worked, it being left to accident whether the material so obtained were durable or not." Now, as we have the experience of older countries to guide us in the choice of building materials, as well as the necessary chemical and mineralogical knowledge which formerly were not possessed, there is no reason why, in the erection of our public buildings, we should blindly commit the same errors, as our (in this respect at least) less enlightened ancestors.

The question then is—should *sandstone* be selected for the construction of Trinity Church? I unhesitatingly say, no; and in this opinion, every competent judge of the character of this rock will coincide. Let us see what is said of it by our standard writers. "In the red sandstone series," says De la Beche, "the beds, with the exception of the conglomerates, [pudding stone,] are seldom sufficiently indurated to serve even for the commonest building purposes." "Sandstone," says Mahan, "is frequently so porous, as to absorb a large quantity of moisture, which, when acted upon by the frost, causes the surface of the stone to disintegrate, or to split off in scales. Sandstone has been used with us in the construction of our public works; in some cases as the principal material, but mostly for the cut stone of the angles, the coping, the water-tables, &c. Its inferiority to granite, and its liability to disintegrate, render it more suitable to ordinary structures; and its use is now mostly confined to edifices built principally of brick, or of rubble work. It should, moreover, only be used as ashlar, or cut stone, because it *adheres very badly to morter* and is, therefore, not suitable for rubble work, the principal strength of which depends on the adhesion be-

tween the stone and the morter." There is, however, a great difference in sandstone, as to durability, this being generally proportiond to its purely siliceous character, and its impermeability to water. Thus while some of the tomb-stones of red sandstone, in Trinity Church-yard have stood one hundred years or more, without much injury, others have scaled down to a thin sheet, the lettering being wholly gone. A chemist and practical geologist can only judge with accuracy as to the comparative durability of different specimens. Some of these sandstones have an argillaceous, and some a siliceous cement; while others have one of a furruginous nature. Those of the siliceous character are far the most desirable. But the best of the class are too perishable, to think of employing it for such a building as Trinity Church ought to be.

It is desirable, perhaps, that the color should be dark. If so, there are varieties of granite, called sienite, like that of which the Astor house is built, of a sufficiently sombre cast; and although the first cost might be considrably more, yet, when its durability is taken into account, it will be found far the cheapest in the end. It is to be hoped that so important a matter will not be acted on without due deliberation. PETROS.

PILE DRIVING BY STEAM.

In reply to the inquiry which has been often made, as to the original cost, cost of working, and utility of this machine, we give the following letter from Mr. Charles B. Stuart, civil engineer, now of the Syracuse and Oswego, but recently of the Syracuse and Utica railroad.

Mr. Stuart was resident engineer on the eastern division of that road; and had charge, for several months, of two of the machines; he therefore speaks from experience, and from a long and intimate acquaintance with him, one of the editors of this Journal can with the utmost confidence say, that his statements may be entirely relied upon—and also that he will cheerfully answer any inquiries from gentlemen desirous of more particular information, which may be addressed to him at Syracuse, N. Y.

SYRACUSE AND OSWEGO RAILROAD OFFICE,
Syracuse, October 7, 1839.

D. K. MINOR, ESQ.

Dear Sir,—Yours of September 30, asking information concerning the cost, economy, etc., of piled road, and the expense, power, etc., of steam pile drivers, as used upon the Syracuse and Utica railroad, is just received, and I take the earliest opportunity to give you the information desired on the subject. Below I copy from my late report to the commissioners of the "*Oswego and Syracuse Railroad*," an extract, in relation to that important improvement in railroad construction. "In low and marshy lands a piled road [similar to that so successfully introduced upon the Syracuse and Utica railroad,] is strongly recommended. On that road the piles are placed 5 feet longitudinally from centre to centre. Wherever there is an abundance of suitable piling timber, I should recommend a distance of four feet, as in this case a narrower tie might be used, and a sufficient reduction made in the size of timber, as very nearly to counterbalance the cost of the additional number of piles. The cost of piled road, is so entirely dependant on the

nature of the ground, and other circumstances which require time for examination, that I can, at present, furnish only an approximate estimate of its expense. It will, however, be entirely within bounds, to base our estimate on the data furnished by the Syracuse and Utica road. On that road the muck was of an average depth of 15 or 16 feet. In many places, piles were driven 25 and 30 feet, and in some instances over 50 feet deep. From the cursory examinations I have made on this road, I should judge the depth of muck generally, in the swamp, does not exceed 8 or 10 feet. The requisite piling timber is found contiguous to the route of this road, and it is evident to my mind, that this kind of structure can here be built cheaper than on the Utica and Syracuse road. On the eastern division of that road, of which I had charge, two piling machines were used, each manned with 6 or 7 men. In 5 1-2 months, the two machines drove 9 1-2 miles through a surfuce of muck, varying from 8 to 26 feet deep. On this road, under the favorable circumstances mentioned, a machine with 7 men, will have no difficulty in driving one mile per month. The wages of the men, including the incidental expenses of the machine, would not exceed $300 per month, thus furnishing, exclusive of timber, a mile of road, ready to receive the superstructure, and equivalent to a graded road with the sills laid, for $300, being less than the actual cost of hemlock sills, for a mile of graded road.

The piling system has, however, other advantages, besides economy of construction. It is not liable to derangement by *frost*. Piles in the most exposed situations on the Syracuse and Utica road, which have stood the frosts of *two winters*, abundantly prove this fact. It is also free from the expense and dangers incident to a graded road, in consequence of the washing of the banks by floods and rains, and settling when on a soft bottom, thereby requiring constant expense to adjust the road and replace the earth. I think it is not going too far, to say that the interest on the money saved by building a pile road, instead of a graded road, wherever the ground is applicable to such a structure, will renew the piles, if necessary, every five years.

The process of saturating the piles and timber of the superstructure with *salt*, can be applied at an inconsiderable expense. From the experiments made on the Syracuse and Utica road, the directors of that company are convinced of its utility, as an antiseptic, and I am informed that they are impregnating all their perishable materials of the superstructure with salt."

It may be well here to remark, that the piles used on the road to which I have referred, were from 12 to 18 inches in diameter, and the ties 4×12 inches. By the proposed reduction in size of timber, mentioned above, owing to their being placed one foot nearer together, piles 10 to 15 inches in diameter and ties 4×8 inches can be used, without impairing the strength of the road. On that road, white pine rails, 8 inches square, were used, in the place of which may be substituted yellow pine rails, 7×8 inches, and still afford a road of greater strength and durability, than when built upon the other plan.

Below, is given a bill of materials, omitting the piles, for one mile of pile road superstructure, together with their cost.

1320	Cedar ties, 8 feet long, 4×8 inches, *a* 30 *c.*	$396 00
2640	White elm tree nails, 1 foot long, 2 inches diameter, *a* 2 *c.*	52 80
49,280	feet (board measure) yellow pine rails, 7×8 inches, *a* $15	739 20
4000	" " white oak ribbons, 1 1-4×3 inches, *a* $25	100 00
3960	cast iron knees, 1 1-2 lbs. each, = 5940 lbs., *a* 5 *c.*	297 00
1320	" " " 2 lbs. each, = 2640 lbs., *a* 5 *c.*	132 00
3200	lbs. pressed spikes, *a* 8 *c.*	256 00
710	end plates, 1 lb. each, *a* 8 *c.*	56 80
30	tons rail plate iron, 2 1-2×3-4 inches, [including transportation,] *a* $70,	2100 00
	Distributing materials,	100 00
	Workmanship,	300 00
	Total,	$4529 80

In reply to your queries, as to the cost, power, and capabilities of the *steam pile driver*, I would briefly state, that the *cost* of the three machines used upon the Syracuse and Utica railroad, constructed at the extensive machine shops of Messrs. *Pond, Higham & Co.* of this city, were $2400 each, *complete.*

They have recently been much improved by them, and are *now* afforded at their shops, for $2250, ready for immediate use. Several have just been completed at their shops, destined for the State of Ohio.

These machines weigh, [including *two* hammers of 900 lbs. each,] about 5 tons. They are of *ten horse power*, with *two* 5 inch cylinders, 7 inch crank and 14 inch sweep. Whole length of boiler 12 feet—the part occupied by the *flues*, is 6 feet long and 2 feet diameter. The fire box is 4 feet long.

Three piston engines, and *one* rotary, are used on this railroad. The *rotary* was manufactured by E. Lynds & Son, Syracuse, and was quite successful.

At a comparatively trifling expense, the machines have been so altered, as to be advantageously used for sawing the *wood* for the locomotives on this road. They can also be profitably employed after the road is constructed, with slight alterations, in the machine shops of the company. When required again for use, the *leaders and necessary fixtures* are easily replaced, and the piling machine again put in full operation. With *leaders* 30 feet long, the hammers will strike from 4 to 5 times per minute, each, when in full motion.

The *average* number of 15 feet piles, driven in 10 or 12 feet muck, by a well managed machine, will be about 100 per day, including the sawing off of the *tops* to receive the rails. Piles, 25 feet long, driven in 20 feet muck, averaged 80 per day, for 60 days, although 120 piles, of this size, were driven by the same machine in 14 hours—and by another machine, 220

piles of 12 feet in length, were driven in the Mohawk river flats, in the short space of 13 hours.

The average length of the piles, on the Syracuse and Utica railroad, [in 19 1-2 miles of piled road,] was 18 feet. The cost of timber 2 1-2 cents per lineal foot, delivered, and the expense of driving, about $285 per mile, including the sawing off to the proper level of the road. If sawed off within two or three feet above the surface of the ground, no danger need be apprehended from *lateral* motion.

Too great care cannot be taken to have a competent and trusty foreman to take charge of these machines, it being very important for the safety of the road, to have the piles, in *every instance*, driven till they reach the hard, or solid bottom, thereby preventing any liability to settle, when passed over by the *heavy locomotives*.

In several instances, on the road alluded to, the substratum was found from 50 to 60 feet below the surface, and was reached by driving piles 30 feet in length, one upon another, and connecting them by a suitable pin at the joint. In every instance, when the bottom was found, not the slightest settling has been perceptible, and the experiment, so confidently made by this enterprizing company, has more than realized their highest expectations.

Any further information that you may desire on this subject, will be cheerfully furnished, by

Yours, truly,

C. B. Stuart, *Civil Engineer.*

The extraordinary interest which attaches itself to the discovery of M. Daguerre, induces us to give the following notice of it which is substantially correct, although wanting in minuteness of detail. The French government having purchased the secret by an annuity of 6000 francs per annum to M. Daguerre, and 4000 to M. Niepce, his coadjutor, have displayed a commendable example of national liberality, and encouragement of art and science.

Several persons in our city, have succeeded in obtaining very striking results, though not reaching the superior beauty of M. Daguerre's plates, in the manipulation of which, he has had years experience.

We need hardly remark, that the assumption of any exclusive knowledge or perfection in this art, by any individual, hinted at, if not directly claimed, in several of our papers, is entirely without foundation.

The Daguerreotype.—It having been announced that the process employed by M. Daguerre, for fixing images of objects by the camera obscura, would be revealed on Monday at the sitting of the Academy of Sciences, every part of the space reserved for visitors was filled as early as 1 o'clock, although it was known that the description of the process would not take place until three. Upwards of two hundred persons who could not obtain admittane remained in the court yard of the palace of the institute. The following is an analysis of the description given on this occasion by M. Arago:—

The influence of light upon colors was known long ago. It had been observed that substances exposed to its action were affected by it; but beyond this fact nothing was known until 1566, when a peculiar ore of silver was discovered, to which was given the name of argent corne, and which had the property of becoming black when exposed to the light. Photographic science remained at this point until it was discovered that this argent corne (chloruret of silver) did not become black under all the rays of light. It was remarked that the red ray scarcely effected any change, whilst the violet ray was that which produced the greatest influence. M. J. Baptiste Porta then invented the camera obscura, and numerous efforts were made to fix the pretty miniature objects which were seen upon the table of it, and the transitory appearance of which was a subject of general regret. All thes efforts were fruitless up to the time of the invention of M. Niepce, which preceeded that of M. Daguerre, and led to the extraordinary result that the latter gentleman has obtained. M. Niepce, after a host of attempts, employed sheets of silver, which he covered with bitumen [*bitume de Judee*] dissolved in oil of lavender, the whole being covered with a varnish. On heating these sheets the oil disappeared, and there remained a whitish powder adhering to the sheet. This sheet thus prepared, was placed in the camera obscura, but when withdrawn the objects were hardly visible upon it. M. Niepce then resorted to new means for rendering the objects more distinct. For this purpose he put his sheets when removed from the camera obscura into a mixture of oil of lavender and oil of petroleum. How M. Niepce arrived at this discovery was not explained to us; it is sufficicient to state that after this operation, the objects became as visable as ordinary engravings, and it only remained to wash the sheet with distilled water to make the drawings permanent. But as the bitume de Judee is rather ash-colored than white, M. Niepce had to discover the means of increasing the shadows by more deeply blackening the lines [hachures.] For this purpose he employed a new mixture of sulphuret of potassium and iodine. But he [M. Niepce] did not succeed as he expected to do, for the iodine spread itself over the whole surface, and rendered the objects more confused. The great inconvenience, however, of the process, was the litle sensitivenes of the coating [*enduit*] for it sometimes required three days for the light to produce sufficient effect. It will easily be conceived, therefore, that this means was not applicable to the camera obscura, upon which it is essential that the object should be instantaneously fixed, since the relative positions of the sun and earth being changed, the objects formed by it were destroyed. M. Niepce was therefore without hope of doing more than multiplying engravings, in which the objects being stationary are not affected by the different relative positions of the sun. M. Daguerre was devoting himself to the same pursuit as M. Niepce when he associated himself with that gentleman, and brought to the discovery an important improvement. The coating employed by M. Niepce had been laid on by means of a dabber, similar to the process used in printing, and consequently the coating was neither of a regular thickness nor perfectly white. M. Daguerre conceived the idea of using the residuum which is obtained from lavender by distilling it; and to render it liquid and applicable with more regularity, he dissolved it in either Thus a more uniform and whiter covering was obtained, but the object, notwithstanding, was not visible at once—it was necessary to place it over a vace containing some kind of essential oil, and then the object stood forth. This was not all that M. Daguerre aimed at. The tints were not deep enough, and this composition was not more sensative than that of M. Niepce. Three days were still necessary to obtain designs. We now come to the great discovery in the process for which M. Daguerre

has received a national reward. It is to the following effect:—A copper sheet, plated with silver, well cleaned with diluted nitric acid, is exposed to the vapour of iodine, which forms the first coating, which is very thin, as it does not exceed the millionth part of a metre in thickness. There are certain indispensable precautions necessary to render this coating uniform, the chief of which is the using of a rim of metal round the sheet. The sheet thus prepared, is placed in the camera obscura, where it is allowed to remain from eight to ten minutes. It is then taken out, but the most experienced eye can detect no trace of the drawing. The sheet is now exposed to the vapour of mercury, and when it has been heated to a temperature of 60 degrees of Reumer, or 167 Fahrenheit, the drawings come forth as if by enchantment. One singular and hitherto inexplicable fact in this process is, that the sheet, when exposed to the action of the vapour, must be inclined, for if it were placed in a direct position over the vapour the results would be less satisfactory. The angle used is 48 degrees. The last part of the process is to place the sheet in the hyposulphate of soda, and then to wash it in a large quantity of distilled water. The description of the process appeared to excite great interest in the auditory, amongst whom we observed many distinguished persons connected with science and the fine arts.

Unfortunately the locality was not adjusted suitable for the performance of M. Daguerre's experiments, but we understand that arrangements will be made for a public exhibition of them. Three highly curious drawings obtained in this manner were exhibited; one of the Pont Marie; another of M. Daguerre's atelier; and a third of a room containing some rich carpeting, all the minutest threads of which were represented with the most mathematical accuracy, and with wonderful richness of effect.—*London Globe of* 23 *Aug.*

INSTITUTION OF CIVIL ENGINEERS.—IMPROVED LEVELLING STAFF.

Mr. Bruff exibited an improved form of Levelling Staff. The figures on this staff are inverted, so that when viewed by an inverting telescope, in the usual manner, they appear erect, and are read off without any danger of mistake; which may readily occur when some figures, as for instance, 6 and 9, are read off inverted. The mechanical arrangements for extending it are with the view of securing greater steadiness. The principal improvement consists in their being attached to the bottom an universal joint, fixed to an iron plate; this plate remaining fixed, the necessary errors consequent on moving the staff for reversing its face, when the last forward station is to become the next back, are avoided.

It was suggested that the universal joint would be attended with great advantages in sloping ground; in general, however, the tripod invented by Mr. Simms was sufficiently convenient.

Mr. Bald suggested that the universal joint would be extremely servicable if placed on something solid. It was his practice to drive a wooden plug into the ground, on which the staff was set; these plugs were left in, and servicable for verifying the observations. He had levelled through a distance of forty miles, leaving a plug at every station.

EXPERIMENTS ON THE FLOW OF WATER THROUGH PIPES OF DIFFERENT LENGTHS.—BY W. A. PROVIS, M. INST. C. E.

In this paper are recorded *two hundred and eight* experiments on the flow of water through leaden pipes of 1½ inch diameter, of lengths 100, 80, 60 and 40 feet, and for heads of water of 35, 30, 24, 18, 12, and 6 inches. The arrangement of the experiments is described with great accuracy, and the results of the experiments are given in twelve tables, showing the length

and inclination of the pipe, the head of water at the upper end of the pipe, the time from turning the water into the upper end of the pipe, to its reaching the lower end, the time of filling the receiver, the discharge in cubic feet per minute, and the mean discharge per minute. To each set of experiments is appended a column of remarks, in which the state of the pipe as to dryness, and the quantity of water in the discharging end, are recorded; these circumstances having considerable influence on the quantity of the discharge.

The experiments are tabulated in a different form, showing the effect of a given head of water in pipes of different lengths and inclinations. The following important results are deduced. In level pipes the quantity of water discharged is nearly in the inverse ratio of the square root of the length; but the departure from this rule is greatest in the shortest lengths and greatest heads. In inclined pipes, the increased discharge is greater in the long than in the short pipes. The increased discharge for an increased head is nearly in the same proportion through the long and short lengths.

TABLE OF GRADIENTS.—BY C. BOURNS, A. INST. C. E.

per mile.				per chain.		per mile.				per chain.	
1 ft.	=	1 in	5280	=	.15 of an in.	31 ft.	=	1 in	170.3	=	4.65 of an in.
2 "		"	2640	"	.30 "	32 "		"	160.0	"	4.80 "
3 "		"	1760	"	.45 "	33 "		"	150.0	"	4.95 "
4 "		"	1320	"	.60 "	34 "		"	155.3	"	5.10 "
5 "		"	1056	"	.75 "	35 "		"	150.8	"	5.25 "
6 "		"	880	"	.90 "	36 "		"	146.6	"	5.40 "
7 "		"	754.2	"	1.05 "	37 "		"	142.7	"	5.55 "
8 "		"	660.0	"	1.20 "	38 "		"	138.9	"	5.70 "
9 "		"	586.6	"	1.35 "	39 "		"	135.4	"	5.85 "
10 "		"	528.0	"	1.50 "	40 "		"	132.0	"	6.00 "
11 "		"	480.0	"	1.65 "	41 "		"	128.8	"	6.15 "
12 "		"	440.0	"	1.80 "	42 "		"	125.7	"	6.30 "
13 "		"	406.1	"	1.95 "	43 "		"	122.8	"	6.45 "
14 "		"	377.1	"	2.10 "	44 "		"	120 0	"	6.60 "
15 "		"	352.0	"	2.25 "	45 "		"	117.3	"	6.75 "
16 "		"	330.0	"	2.40 "	46 "		"	114.8	"	6.90 "
17 "		"	310.6	"	2.55 "	47 "		"	112.3	"	7.05 "
18 "		"	293.3	"	2.70 "	48 "		"	110.0	"	7.20 "
19 "		"	277.9	"	2.85 "	49 "		"	107.7	"	7.35 "
20 "		"	264.0	"	3.00 "	50 "		"	105.6	"	7.50 "
21 "		"	251.4	"	3.15 "	51 "		"	103.5	"	7.65 "
22 "		"	240.0	"	3.30 "	52 "		"	101.5	"	7.80 "
23 "		"	229.5	"	3·45 "	53 "		"	99.6	"	7.95 "
24 "		"	220.0	"	3.60 "	54 "		"	97.8	"	8.10 "
25 "		"	211.2	"	3.75 "	55 "		"	96.0	"	8 25 "
26 "		"	203.1	"	3.90 "	56 "		"	94.3	"	8.40 "
27 "		"	195.5	"	4.05 "	57 "		"	92.6	"	8 55 "
28 "		"	188.6	"	4.20 "	58 "		"	91.0	"	8.70 "
29 "		"	182.1	"	4.35 "	59 "		"	89.5	"	8.85 "
30 "		"	176.0	"	4.50 "	60 "		"	88.0	"	9.00 "

DESCRIPTION AND DRAWING OF THE ICE BOAT.—BY S. BALLARD, A. INST. C. E.

The principle of breaking ice adopted by Mr. Ballard, as explained in a communication made last session, consists in forcing the ice upwards instead of forcing through it horizontally, or by pressing it down. for this

purpose a frame, coated with sheet iron is laid over the front of a boat with an inclination downward from the boat, the lower end being under the ice. The paper describes the construction of the boat by reference to to a detailed drawing and section.

ON THE CONSTRUCTION OF ROADS ON DEEP BOGS AND MOSS.—BY W. BALD.

In this paper the author gives a detailed account of the construction of roads through bogs, and of the methods of securing the foundations of small bridges in boggy places; also some suggestions on the formation of railways on deep moss.

The general principles are as follows:—The first operation after laying out the line of road is to drain thoroughly the bog over which it is to pass. For this purpose main drains and counter drains parallel to the line of road are to be cut with a regular discharging fall along the bottom. Transverse drains must also be cut betwixt the main and the counter drains, so as effectually to drain off all the surface water and stagnant pools. The cutting of these drains must be carried on gradually, and by degrees; if the bog be moist, the opperations, which can only be carried on at dry seasons of the year, will probably have to be continued over three or four years before the drains become permanently fixed at the required dementions. The counter drains are essential, as they relieve the pressure on the sides of the main drain, and consequently prevent it filling up. The bog stuff cut out is to be dried, and when the bog under the line of road has become sufficiently dry, the road is to be levelled, and made of propper shape, and the cross drains are to be filled with dry turf.

The road-way is then to be floored or trunked over with five courses of dry heathy sods, which are to be well rolled with a heavy cylinder.—Upon this trunking is to be laid a soiling, consisting of a mixed mass of prepared earth and gravel, of about six inches in thickness, and the whole to be coated with good clean gravel. The road metal is then to be laid on, in two successive coats, each of about three inches in thickness, the first being well consolidated before the second is laid on.

The great points to be aimed at, are perfect drainage and good trunking, as, if these are not attained, roads constructed on bog will lose their shape, become ruinous, and soon go to decay.

The author considers the form and size of hammers employed in breaking hard stones.

These are frequently too heavy; a hammer weighing about a pound and a quarter, of an elliptical form, pointed at the ends, the area of end being about one hundredth part of a square inch, appears to be best suited for ordinary purposes.

The turf of bog, being carbonized, makes excellent fuel, and may be employed in the manufacture of iron, and such iron is extremely malleable. Turf fuel is also used most extensively in working the steam engine in many districts of Ireland; it is used on board the Dunally steam boat, for engines of eighteen horse power, and the expense is four pence per mile.

CHARLESTON AND CINCINNATI RAILROAD.—At a meeting of the Chalesston and Cincinnati Railroad Company, at Ashville, N. C., on the 16th, inst., a resolution was passed to suspend all works beyond Columbia until the road to that place be first made, and also another resolution, that the States interested in the project be informed that the road must stop at Columbia, unless they come to its assistance.

It is understood that the aid of the States in question will not be granted, and consequently the road must stop at Columbia.

THE OHIO RAILROAD.—We have had occasion within the past few weeks to allude to this work. The following extract from a letter received this morning, will give our readers some idea of its progress, and the plan of its construction.

Lower Sandusky, July 15th, 1839.

The business of the company is now principally confined to the two first divisions of the road, extending from Manhattan to Maumee river, through the Black Swamp, to this place, a distance of thirty miles. The road is cleared and grubbed ready for driving the piles the whole distance. The piles, 76,680 in number, are on the line ready for use. The several contracts for the delivery of the ties are in part completed and in full progress. The trestle bridge, 90 feet in length, near this place, and a similar bridge, 390 feet long across Muskalunge creek, are completed, and timber for the balance of the bridging on these two sections is on the ground.

The company now have in successful operation two of Crane's patent steam pile drivers, one at this place going west, and one at Maumee coming east. They will drive about 100 piles each per day, and as the piles are driven five feet from centre to centre, each machine will make fifteen rods of road per day. They drive two rows at once, or two piles at a time. I am confident they will make a more permanent and much cheaper road than can be made in any other way. We have also two cars which follow the pile drivers, in which the workmen eat and sleep. They are 24 by 14 feet, commodious and airy, with a kitchen and dining room, which at night is occupied as a sleeping room. We are now building some freight cars for the purpose of more conveniently transporting timber, provison, etc. A portion of the track is cleared, and piles and timber are on the line of the two next, or third and fourth divisions, extending from this place to Huron. In short, everything appears to be going ahead, with that spirit of energy which shows a determination on the part of the company to complete the road with the least possible delay and in the best manner.—*Buffalo Commercial Advertiser.*

THE READING RAILROAD: ITS ADVANTAGES FOR THE CHEAP TRANSPORTATION OF COAL, AS COMPARED WITH THE SCHUYLKILL NAVIGATION AND LEHIGH CANAL. BY MR. EDWARDS.

(Continued from page 190.)

READING RAILROAD.—NO. VII.

The ability of the locomotive engines to perform the full number of trips stated in No. III., as the annual work for each engine on the Reading railroad engaged in drawing the coal cars, will now be examined.

The work for each engine was there estimated at 100 full trips annually, with 150 tons of coal at each trip, or in all, 15,000 tons of coal *per annum*. The distance from Pottsville to the Delaware and returning, for each trip would be 188 miles; or, in all, for 100 trips, 18,800 miles. The load would average for the whole distance 75 tons, or be equal to 75 tons carried 18,800 miles, or 1,410,000 tons carried one mile.

The great advantage of the Reading railroad is, its unparalleled grades—thus, for example: were the grades of the Reading railroad occasionally ascending from the mines, yet not exceeding 40 feet per mile, [the grade that has very generally been admitted on our railroads] the power that is only sufficient to draw on the Reading railroad from the mines to this city, over the levels and descents of that road, 150 tons of coal, in say 50 cars weighing 75 tons, in all 225 tons, would be barely able to draw 45 tons of coal in 15 cars weighing 22 1-2 tons—in all 67 1-2 tons. And

the engine performing her full number of trips, 100 annually up and down, would bring but 4,500 tons *per annum*. The distance travelled would be the same [say 18,800 miles.] The load would average for the whole distance 22 1-2 tons, or equal to 22 1-2 tons carried 18,800 miles, or 423,000 tons carried 1 mile.

The ability of the engines on the Reading railroad, as to the number of miles *per annum*, which I have taken as the basis for the estimate of the cost per ton for motive power in No. III., was, as above stated, 18,800 miles; which is below the average of ten of the best engines owned by the Liverpool and Manchester railway company. They, it will be seen, averaged, during the year 1831, 18,265 miles each; during the year 1832, 19,372 miles each; during the year 1833, 22,011 miles each, or equal during the year 1831, to 97 full trips on the Reading railroad, during the year 1832, to 103 full trips; during the year 1833, to 117 full trips. It will also be seen that during the first twelve weeks of 1834, the average number of miles travelled weekly by each engine, was increased from 438 miles, the average of 1833, to 538 miles, which, for 52 weeks, would be 27,976 miles *per annum*, or equal to 149 full trips on the Reading railroad.

From this it will be seen, that engines travelling at high velocities, on the Liverpool and Manchester railroad, and therefore, much more liable to get out of repair, than engines travelling at low velocities, [besides, they perform only 30 mile trips in continuation, whereas, on the Reading railroad, the engines will perform 94 miles in continuation] were nevertheless able to travel during the year 1833, the Jupiter 31,582 miles, the Ajax 26,163 miles, the Firefly 24,874 miles, and so down to the Etna 17,763 miles, and that they averaged upwards of 22,000 miles for each engine, during that year.

The Chevalier de Pambour concludes the article I am about to extract from his valuable work, with these words: "This statement shows what can be expected from locomotive engines, when constructed with care and of good materials, and there is no doubt that, in time, more work will still be obtained from them." This was written in 1834. Since that period locomotive engines have been improved, and are now, owing to more perfect construction, much less liable to get out of repair than formerly.

Why, then, do we not realize the full advantages of locomotive power? The answer is obvious—instead of adapting our railroads to locomotive power, we adapt them to our limited cash means, and hence there are up and down grades, according to the surface of the country, through or over which the railroad passes. Our economy in the original outlay, entails upon us an increased cost for locomotive power, more than equal, where the trade is large, to the interest upon a sum that would have been sufficient to make a proper railroad.

It is here, that the projectors of the Reading railroad have shown correct judgment and prudent foresight; for the trade they were to compete for required that the cost of transportation should be low. It might have been questioned, whether the large outlay of money could be justified; the result of their deliberation we have before us, in the most perfect grades for cheap railroad transportation in the world, and a consequent ability to transport at the lowest possible cost per ton.

There is perhaps no better authority than the Chevalier de Pambour on the subject of railroads and locomotive power. Much of his time was devoted to their study, and the result of his labors is a standard work, referred to at all times with confidence. From it I extract the following:

"In order to execute this haulage [gross weight of goods and cars 233,-114 tons; gross weight of passengers and cars 140,662 tons; in all 373,-776 tons] the engines made 6570 journeys, drawing stage coaches, that is to say, with a velocity of 20 miles an hour, and 5086 journeys with goods, or with a velocity of 12 1-2 miles an hour—the average velocity of the haulage was consequently in miles per hour 16 73-100 miles.

"We have said elsewhere, that the Liverpool and Manchester railway company possesses at present thirty locomotive engines. It must not be concluded, however, that that number is necessary in order to execute the above said haulage; of these 30 engines, about one third are useless; they are the most ancient, which having been constructed at the first establishment of the railway, at a time when the company had not yet obtained sufficient experience in that respect, are found now to be out of proportion with the work required of them. The engines actually in daily activity on the road, amount to about 10 or 11, and with an equal number in repair or in reserve, the business might completely be ensured; this is in fact what happens at present, the surplus above that number being nearly abandoned.

"We shall complete what we have just been saying on the Liverpool locomotive engines, by adding a document, that will show, what these engines are capable of executing in a daily work, and the improvement they have undergone in the course of the last few years in respect to the solidity of their construction.

"*Work done by the ten best engines of the Liverpool and Manchester railway, during the years* 1831, 1832, 1833, *and the first twelve weeks of* 1834.

Year	Name of engine.	Total distance travelled.	Total time in use or repair.	Year	Name of engine.	Total distance travelled.	Total time in use or repair.
		miles.	weeks.			miles.	weeks.
1831	Mercury,	23,212	52	1832	Vulcan,	26,053	53
	Jupiter,	22,528	44		Liver,	22,651	43
	Planet,	20,404	52		Venus,	20,464	52
	Saturn,	19,510	38		Etna,	20,399	52
	Mars,	18,645	50		Saturn,	20,312	52
	Majestic,	18,253	52		Vesta,	17,739	52
	North Star,	15,677	52		Victory,	17,082	52
	Northumbrian,	15,607	52		Planet,	16,885	52
	Phœnix,	15,405	52		Sun,	16,535	52
	Sun,	13,434	37		Fury,	15,603	52
	Sum,	182,675	481		Sum,	193,723	511
	Aver. pr week,	380			Aver. per week	379	
1833	Jupiter,	31,582	52	1834	Firefly,	8,542	12
	Ajax,	26,163	52		Vulcan,	8,526	12
	Firefly,	24,879	39		Saturn,	7,290	12
	Liver,	23,134	52		Liver,	7,080	12
	Pluto,	20,308	52		Sun,	7,080	12
	Vesta,	19,838	52		Etna,	6,557	12
	Leeds,	19,364	48		Leeds,	5,712	12
	Saturn,	18,738	52		Ajax,	4,890	12
	Venus,	18,348	52		Venus,	4,632	12
	Etna,	17,763	52		Pluto,	4,246	12
	Sum,	220,117	503		Sum.	64,555	120
	Aver. pr week,	438			Aver. per week	538	

"Among those engines the Liver had worked for 107 weeks, had travelled 52,865 miles, or on an average 494 miles a week, during all that time. The Firefly had worked 57 weeks, had travelled a distance of 33,421 miles, or 586 miles a week, and neither of these engines, at the period in question, had yet required a fundamental repair.

"This statement shows what can be expected from locomotive engines

when constructed with care and of good materials, and there is no doubt that in time more work will still be obtained from them."

The total work for each engine, as estimated in No. III., being 18,800 miles annually, from the above table it will be seen that in each year's operations on the Liverpool and Manchester railroad, their average was beyond it, with the single exception of the first year; and even this is accounted for by the fact, that the Jupiter was only 44 weeks in use, the Saturn 38, and the Sun 37 weeks [they not being finished at the commencement of the year].

READING RAILROAD.—NO. VIII.

As regards the amount of business for this railway, when finished, some opinion may be formed from examining what amount has actually been paid on the Schuylkill navigation for freight and toll during the last four years.

During the year 1835, the total amount of tonnage per the Schuylkill Navigation was 535,194 tons, the greater part of which passed through the whole length of the canal; say equal to 471,352 tons passed the entire distance, which, at a toll of 92 cents per ton, gives a total receipt for tolls of	$433,643
The freight on coal, during this year, 1835, averaged $1 19 per ton; if therefore we assume this as the average freight on all that passed through the canal, it gives for freight on 471,352 tons at $1 19 per ton,	560,908
	$994,551

Being for freight and tolls during 1835, nine hundred and ninety-four thousand, five hundred and fifty-one dollars.

This sum, paid to the Reading railroad company during the year, for freight and toll on the same number of tons would give [estimating 300 working days in the year] a *daily receipt of three thousand, three hundred and fifteen dollars.*

During the year 1836, the total amount of tonnage was 631,173 tons; say equal to 568,079 tons passed the whole length of the canal, which, at a toll of 92 cents per ton, gives a total receipt for tolls of	$522,633
The freight on coal during 1836, averaged $1 50 1-2 per ton; assuming this as the average, we have for freight, 568,079 tons at $1 50 1-2 per ton	854,958
	$1,377,591

Being for freight and tolls during 1836, one million, three hundred and seventy-seven thousand, five hundred and ninety-one dollars.

This sum, paid to the Reading railroad company during the year, for freight and toll on the same number of tons, would give [estimating 300 working days in the year] a *daily receipt of four thousand, five hundred and ninety-two dollars.*

During the year 1837, the total amount of tonnage was 726,730 tons; say equal to 656,727 tons passed the whole length of the canal, which, at a toll of 92 cents per ton, gives a total receipt for tolls of	$604,189
The freight on coal during 1837 averaged $1 27 1-4 per ton; assuming this as the average, we have for freight, 656,727 tons at $1 27 1-4 per ton,	835,685
	$1,439,874

Being for freight and tolls during the year, 1837 one million, four hundred and thirty-nine thousand, eight hundred and seventy-four dollars.

This sum, paid to the Reading railroad company during the year for freight and toll on the same number of tons would give [estimating 300 working days in the year] *a daily receipt of four thousand, seven hundred and ninety-nine dollars.*

During the year 1838, the total amount of tonnage was 643,633 tons; say equal to 549,295 tons passed the whole length of the canal, which, at a toll of 92 cents per ton, gives a total receipt for tolls of $505,351

The freight on coal, during 1838, averaged $1 16 per ton; assuming this as the average, we have for freight 549,295 tons at $1 16 per ton $1,142,533

Being for freight and tolls during the year 1838, one million, one hundred and forty-two thousand, five hundred and thirty-three dollars.

This sum, paid to the Reading railroad company during the year, for freight and toll on the same number of tons, would give [estimating 300 working days in the year] *a daily receipt of three thousand eight hundred and eight dollars.*

Thus it will be seen, that there has actually been paid during the year 1835, $994,551; during the year 1836, $1,377,591; during the year 1837 $1,439,874; and during the year 1838, $1,142,553, for freight and toll on the Schulkill navigation, estimating the freight on merchandize etc., the same as on coal, whereas the charge for freight on articles other than coal is much higher; which, had it been included, would have further swelled these already large amounts.

It is for this immense trade that the Reading railway is intended to complete—its ability to transport at a lower rate than either the Schuylkill navigation or Lehigh canal, and consequently to secure to itself the whole of that trade, has we think, been fully demonstrated in the foregoing numbers. Unlike many of our public works, which have been undertaken before the amount of travel or transportation was sufficient to justify the outlay, the Reading railroad comes into the field to secure a trade already established, vast indeed in the amounts annually paid for transportation, but as yet comparatively in its infancy.

Another important consideration in regard to this valuable improvement is, whether, when it shall have realized what is now so confidently predicted, it can itself be hereafter interfered with by any rival undertaking.

It is therefore important to show that the danger from future rivalry, thus stimulated, was not overlooked by the projectors of this road, and that there is good ground for believing that it cannot hereafter be superseded by any known means of transportation.

On the immediate line of the road from Pottsville to Philadelphia, following, as it does, the valley of the Schuylkill, the best points and the most favourable ground for the road have been adopted; and when we take into consideration the minute and careful examination of the country made by the distinguished engineers of the road before the rout was finally located, their declaration that "they have so pre-occupied the ground as entirely to exclude another feasible location" will be readily believed; while independently of the natural obstacles, the already immense capability of the road could be so much increased by laying two additional tracks, as would of itself effectually prevent all interference.

For the supply of the city of New York, Brooklyn, and the towns on the north river, etc., various lines of canals from the Delaware have been in

operation for sometime, viz: the Delaware and Hudson canal capable of passing boats with an average load of 30 tons; the Morris canal from Easton to Jersey city, one hundred and one miles long, capable of passing boats with an average load of 22 tons; and the Delaware and Raritan canal, from Bordentown to New Brunswick, 43 miles, and thence 45 miles by river to New York; this last named canal is capable of passing boats with 200 tons.

The coal passing through the Morris canal has to come through the Lehigh canal, from Mauch Chunk, 46 miles to Easton, and thence by that canal to Jersey city opposite New York.

The coal to pass through the Delaware and Raritan canal has to come through the Lehigh canal 46 miles, and thence 60 miles through the State canal to Bristol, in boats averaging 52 tons, where it is loaded into the barges carrying 200 tons, thence 10 miles by the river Delaware to Bordentown, where it enters the Delaware and Raritan canal for New York.

A line of railroad from Easton to Jersey city has also been surveyed; but owing to the high grades requir-d [40 to 60 feet being nesessary for considerable distances] it has been deemed impracticable to construct one through that country capable of carrying coal in competition with the Delaware and Raritan canal; for it will readily be seen that in making a railroad to carry coal from Easton to Jersey city, the competition would not be with the Morris canal, passing boats with only 22 tons, but with the Delaware and Raritan canal passing boats with 200 tons.

Had such an improvement as the Delaware and Raritan canal been practicable between Philadelphia and Pottsville, the Reading railway would probably never have been undertaken; or at least not until the increase of business would have allowed profitable occupation to both.

A natural connection may be said to exist between the Reading railroad and the Delaware and Raritan canal, for as the capacity of an engine and train on the Reading railroad is 200 tons, and the capacity of the boats on the Delaware and Raritan canal the same, they will together form a continuous line of inland transportation, cheaper than any other, for coal and heavy freights.

Having thus far confined myself chiefly to an examination of the capability of the Reading railroad as a COAL RAILWAY, it may be necessary hereafter to examine how far the value of the improvement may be enhanced as a line for the conveyance of passengers and merchandize, when the various railroads proposed to connect with this road shall be completed.

REPORT OF THE DIRECTORS OF THE EASTERN RAILROAD COMPANY IN NEW HAMPSHIRE.

To the Stockholders of the Eastern Railroad Company, in New Hampshire, at their annual meeting to be holden at Portsmouth Sept. 4, 1839.

The Directors of said company respectfully report,—That after the election of the major part to the present Board of Directors, the attention of the Board was turned to a re-location of the road, from the line of Massachusetts to Portsmouth. On examining the surveys formerly made under the direction of Mr. Barney, the Board were satisfied that these, for want of time, were not so minute and thorough as the importance of a proper selection of the route demanded. They therefore directed a re-survey of the country, through which the road is to pass, and an examination of all the routes which have been heretofore examined or suggested.

The railroad company in New Hampshire was incorporated a few months after the eastern railroad company in Massachusetts, the route

of whose road passes through Newburyport to the line of New Hampshire, at Salisbury, and was authorized to build a road from Salisbury or Seabrook (the adjoining town) to Portsmouth. It was evidently the intention of the legislatures of the two States, that the line of road should be continuous from Boston to Portsmouth; and the road in Massachusetts must, by the charter, cross the Merrimack river at, or near the scite of the present Newburyport bridge. This point therefore, must form one terminus of a road from the Merrimack to the Piscataqua. By the provisions of the act of the last sesion of the legislature of New Hampshire, authorizing a re-location of the line of the road, the terminus in Portsmouth is fixed at or near the Universalist church in that town. This act having been accepted by the company, of course fixes the eastern terminus. The termini of the road being thus determined, the action of the directors was confined to the selection of the most practicable and preferable route for a railroad between them:--and however desirable it might be to have had the whole route open both in its course and termini, for the unembarrassed action of the directors—yet they believe that the most eligible route, under existing restrictions, has been selected.

The report of Col. Fessenden, the engineer of the road, on the subject of the location, has been presented to the directors, and been very fully examined and considered by them, and the route recommended by him has been adopted.

This route leaves the Merrimack river at the Newburyport bridge—thence passing over Salisbury marsh, westwardly of the county road, and the village at old Salisbury, comes to the State line at a point a little eastwardly of the main road. At this point the location in New Hampshire commences--and crossing little marsh and passing about one third of a mile eastwardly of the village at Hampton Falls, crosses the main road westwardly of Hampton Falls landing, and then the marshes, to old Hampton village, running near the stage road—thence through the swamp near the school house, and over the western point of breakfast hill, to cedar swamp in Greenland—and thence by Messrs. Young's and Hussey's, crossing the Greenland road above the plains—and thence curving lightly to the right, crosses the Islington and Middle roads, and Joshua street, to the mill pond—thence over the pond to the depot, near the Universalist church.

The line thus run is fifteen miles and 2570 feet in length in New Hampshire. It is composed, for most of its length, of four straight lines, connected by short favorable curves, of a mile radius. It passes over a face of country remarkably favorable for a railroad route, requiring no inclinations greater than 35 feet per mile—and that for one plane only, the rest being 30 feet per mile and under;—nearly all the important roads in the vicinity of Portsmouth admitting of independent crossings.

Another route running eastwardly of the one above described, and pursuing a course from one half to about two and a half miles distant, was also surveyed and reported upon. This also may be considered a favorable route as to grades, and the ground over which it passes. In distance, it is about half a mile shorter, in inclinations somewhat less, than the route selected, and has a straight line of about nine miles, the remainder being much curved. The comparison of the two routes in relation to directness and freedom from curves, is decidedly favorable to the route selected, which has ninty-nine degrees, while the eastern route has 298 degrees of curvature.

In forming their judgment, as to which of these two lines should be selected, the directors were influenced by the considerations:—

First, that while either route would pass from one termini to the other, without materially obstructing the travelled roads, the route selected would in addition, pass above the navigation of all the rivers, while the eastern route would cross two or three streams, where draws would be necessary.

Second, the marsh embankment on the selected route will be much less exposed to the action of the sea and ice, than that upon the eastern route.

Third, there is much less bridging subject to decay, upon it, than upon the eastern route.

Fourth, the estimated expenses of the two routes is about twelve thousand dollars in favor of the selected route, and

Fifth, and chiefly, the selected route, by embracing and commanding the travel of a broader belt of country, will, while it gives larger accommodations to the public, secure a greater amount of travel.

The route being selected, and proposals advertised for, and received; the grading and masonry of the line has been contracted for on favorable terms, with Messrs. Sewall F. Belknap, of Beverly, and Samuel Turner, of Dedham, in one contract, who have engaged to complete the same, ready for the superstructure, half by first of April, and the remainder by the first of June next. The directors have the greatest confidence in these contractors, and believe the work will be done in a workmanlike manner, and within the stipulated time. Arrangements have been made for procuring the rail iron; the fencing is already under contract and proposals are being received for the under sills, sleepers, spikes, keys, etc.

Negotiations have been commenced for the settlement of land damages, procuring lands for depots, etc. And the directors confidently believe that the road may be completed for use early the next season.

All which is respectfully submited. *In behalf of the Directors.*

B. T. Reed, *President pro tem.*

REPORT AND PLAN OF THE SURVEYS AND DEFINITE LOCATION OF THE EASTERN RAILROAD IN NEW HAMPSHIRE.—BY JOHN M. FESSENDEN, CIVIL ENGINEER.

To the President and Directors of the Eastern Railroad Company in New Hampshire.

Gentlemen,—Previously to the re-organization of your company, at the request of the directors of the eastern railroad company in Massachusetts, I made, accompanied by my assistant Mr. Wilder, a particular examination of the country through which your road is to be constructed. The result of this examination was a conviction that a much more favorable location might be made than there had been by the previous surveys. Immediately after this examination, the levels and direction of the most favorable eastern and western line were obtained, and they fully confirmed the opinion which I had formed.

After the re-organization of your company, agreeably to your instructions I directed the lines of location to be run; advertised for proposals for the grading, etc., of the road, and hastened to prepare the work for the contractors, and I have now to report on the different lines located, as follows: referring to the accompanying plans and profiles.

The western line as located, after leaving Newburyport, passes through the towns ot Salisbury, Seabrook, Hampton Falls, Hampton, North Hampton, Greenland and Rye to Portsmouth.

The eastern line passes through the same towns, with the exception of Greenland, its course being generally from one half to two miles nearer to the sea coast. The length of the western line from the Merrimack river to

the Universalist meeting house, on Pleasant street, in Portsmouth, is 19 miles, 380 feet.

The length of the eastern line between the same points is 18 miles, 3448 feet; difference 2212 feet.

The length of the western line, from the Merrimac river to navigable water in Portsmouth is 19 miles, 1080 feet.

The length of the eastern line to navigable water in Portsmouth is 19 miles; difference 1080 feet.

The length of the western line in Massachusetts is 3 miles, 3090 feet, and in New Hampshire 15 miles, 2570 feet.

The length of the eastern line in Massachusetts is 3 miles, 1235 feet, and in New Hampshire 15 miles, 2213 feet.

17 miles, 1820 feet of the western line is straight.
1 " 3840 feet is curved on radii of 1 mile.
15 " 1288 feet of the eastern line is straight.
3 " 2160 feet is curved on radii of 2-3 of a mile.

The grades of the two lines, passing from the Merrimac river eastward, are as follows;

Of the western line.
4 miles, 5180 feet level.
7 " 1740 feet descending 30 to 15 feet per mile.
6 " 4020 feet ascending 15 to 35 " "
19 miles, 380 feet.

Of the eastern line.
5 miles, 4388 feet, level.
6 " 1120 feet, descending 30 to 20 feet per mile.
6 " 3220 feet, ascending 13 to 30 " "
18 miles, 3448 feet.

Estimate of grading, masonry and bridging, and cost of the same, on the western line.

Section 1. *Length* 9,300 *feet.*

600	running feet of frame structure at $3 per foot,	$1,800
1	abutment of stone,	400
42,400	yards excavation (24,000 marsh,) 17 cts.,	6,784
500	perches culvert masonry,	750
1	bridge and abutments,	600
	road and farm crossings,	200

Sec. 2. *Length* 9,630 *feet.*

18,700	yards excavation, at 18 cts.,	$3,366
1,300	" rock " 1,00	1,300
700	perches culvert masonry,	1,050
	road crossings,	150
	Total to the State line,	$16,400

Sec. 3. *Length,* 9,170 *feet.*

37,000	yards excavation, at 18 cts.,	$6,660
300	perches culvert masonry,	450
	bridge or culvert, Smith's pond,	700
	farm crossings,	100

Sec. 4. *Length*, 9,900 *feet.*

38,000 yards excavation, [17,000 marsh,] 17 cts.,	$6,460
500 yards rock excavation, at $1,00,	500
700 perches culvert masonry,	1,050
road and farm crossings,	250

Sec. 5. *Length*, 11,500 *feet.*

72,000 yards excavation [11,000 marsh] 22 cts.,	$15,840
800 perches culvert masonry,	1,200
1 road bridge,	800
road and farm crossings,	400

Sec. 6. *Length* 9,700 *feet.*

38,500 yards excavation at 17 cts.,	$6,545
400 perches culvert masonry,	600
2 road bridges,	1,600
road crossings,	200

Sec. 7. *Length*, 11,300 *feet.*

37,800 yards excavation at 17 cts.,	$6,426
700 perches culvert masonry,	1,050
1 road bridge,	1,000
road crossings,	100

Sec. 8. *Length*, 9,400 *feet.*

23,000 yards excavation at 17 cts.,	$3,910
1,000 yards rock excavation at $1,00,	1,000
700 perches culvert masonry,	1,050
road crossings,	250

Sec. 9. *Length*, 10,300 *feet.*

35,000 yards excavation, at 18 cts.,	$6,300
1,000 rock excavation, at $1,00,	1,000
800 perches culvert masonry,	1,200
1 road and farm bridge,	1,400
road crossings,	200

Sec. 10. *Length*, 10,500 *feet.*

28,000 yards excavation, at 18 cts.,	$5,040
600 running feet bridging, at $6,00,	3,600
2 abutment and bank walling,	1,200
800 perches culvert masonry,	1,200
2 road bridges and crossings,	2,219
Total from the State line,	$81,500

Estimate of grading, masonry and bridging, and cost of the same on the eastern line.

From the Merrimac river to the line of the State.

1,400 running feet of frame and pile structure at $3 per ft.,	$4,200
1 abutment of stone,	400
70,000 yards excavation at 18 cts.,	12,600
2,400 yards rock excavation at $1,00,	2,400
1,050 perches culvert masonry,	1,575
road and farm crossings,	350
Total	$21,525

From the line of the State to Portsmouth.

309,000 yards excavation at 18 cts.,	$55,620
13,100 yards rock excavation at $1,00,	13,100
4 road bridges,	3,200
road and farm crossings,	1,500
1,625 running feet of bridging at $6,	9,750
14 bridge abutments,	3,500
3,850 perches of culvert masonry,	5,825
2 draws and piers,	5,000
Total,	$97,495

The aggregate cost of the whole road from the depot in Newburyport, by the western line to Portsmouth, is thus estimated.

For grading, damages, &c., in Newburyport,	$8,000
" bridge across Merrimac river,	45,000
" grading, masonry and bridging to the State line,	16,400
" 3 3-5 miles of railway or superstructure, at $8,500 per mile	30,600
" land, damages, and fencing,	5,500
" depot,	500
" engineer department and salaries,	2,000
Total to the line of the State,	$108,000
For grading, masonry and bridging from State line to Portsmouth	$81, 500
For 16 2-5 miles of railway at $8,500	139,400
" land, damages, and fencing,	31,000
" depot buildings, and fixtures,	10,100
" engineer department and salaries,	13,000
Total from line of the State,	$275,000
Total cost of the whole road,	$383,000

The aggregate cost, by the eastern line, is thus estimated:—

For grading, damages &c., in Newburyport,	$8,000
" bridge across Merrimac river,	45,000
" grading, masonry and bridging to the State line,	21,525
" 3 1-4 miles of railway at $8,500,	27,625
" land, damages, and fencing,	5,000
" depot,	350
" engineer department and salaries,	2,000
Total to the line of the State,	$109,500
For grading, masonry, and bridging from State line to Portsmouth,	$67,495
For 16 1-4 miles of railway at $8,500,	138,125
" land, damages, and fencing,	28,780
" depot buildings and fixtures,	10,100
" engineer department and salaries,	13,000
Total from line of the State,	$287,500
Total cost of the whole road,	$397,000

The advantages possessed by the western line are,

1. That it runs more inland, and through a denser population than the eastern line, and moreover secures all the travel which the eastern line would have, indeed all the sea cost. It runs about two miles nearer than the eastern, to New Market and Greenland; the former being about seven,

the latter one and three-fourths miles from the western line; thus making the distance from Boston to New Market by the eastern railroad short of 57 miles.

2. The western route can very easily be continued to cross the Piscataqua river by a bridge, while by the eastern it is easier to cross that river by a ferry, a great objection to which, being loss of time. The facilities however for a ferry are very great—it would be short, direct, over smooth water, and not expensive to maintain.

I would remark here, that I have examined with much care, the facts connected with the construction of a bridge to cross the Piscataqua for the direct continuation of the railroad to the eastward, and I state with certainty that there will be no difficulty in constructing a very superior bridge across this river, safe and firm in every respect, and free from the objections connected with the present structure. I estimated with minuteness the cost of such a bridge, and found it, for one which would accommodate both the common and the railroad travel, less than $80,000, or less than $40,000 for the accommodation of each; it is well known that for the common travel this sum would be a very reasonable expenditure.

3. The western line is free from draws, while the eastern must have two or three.

4. The western line has the most straight line, and the least curved, and the curves are on the greatest radii.

5. The marsh embankments are very much more exposed on the eastern than on the western line, to the action of ice and the sea.

6. The western line has much less bridging than the eastern—this bridging is chiefly objectionable on account of decay and danger from fire.

The only advantage possessed by the eastern line, which I am aware of is that of distance—it being about half a mile shorter than the western, to the Universalist meeting house, and one-fifth of a mile shorter to navigable water. With regard to the differences of grades and expense, they are small—that of the grades being in favor of the eastern, and that of the expense of the western line.

The excavation on both routes will be in gravel and sand, coarse gravel and marsh chiefly—there being very little clay on either line. The quantity of rock excavation is unusually small on both routes—on the western but 4,000 yards and on the eastern about 15,000 yards.

The whole length of the railroad from Boston to the proposed depot in Portsmouth, by the western line, is 53 miles, 2390 feet; by the eastern line it is 53 miles, 178 feet. In connection with these distances, it may be proper to remark, that from examinations which I have made, the length of a railroad to Dover from Portsmouth, would be short of 10 miles; making the distance from Boston to Dover, should such a road be built, not exceeding 63 miles.

The grading, etc., of the road is so favorable, that the whole may be completed, and the road be made ready for travel, within a year from this time. As to the advantages which it will offer when built, and its prospects of success, they are too well known and too certain to require any detail. The certainty that it will be decidedly for the interest of the eastern steam boats to run from Portsmouth instead of Boston, by which they will escape entirely the unsafe and tedious part of their routes, is obvious; and the travel from and to them alone, though not a moiety of that which will pass over the road, will yield a large revenue to the stockholders.

I cannot close this report without stating, that much credit is due to Henry Wilder, Esq., my assistant engineer, and those who composed

the party under him, for the faithfulness and perseverance manifested by them in making the surveys and plans for this report. The time allowed to them was very short, and they have performed the duty thoroughly and well.

Respectfully submitted,

JNO. M. FESSENDEN.
Engineer eastern railroads in N. H. and Mass.

SALEM, August 15. 1839.

HARLEM RAILROAD.—*Celebration of the completion of the double track.*

This enterprizing company celebrated on the 3d inst., at Nowlan's pavilion the final completion of their great work. They have excavated, blasted and levelled formidable rocks—filled up deep ravines—constructed substantial bridges, and laid down substantial rails—with all these obstacles they have persevered through evil, and through good report—they have employed thousands of laborers and honorably paid them—at last they have reached the completion of their scheme, and have laid down a *double track* from the centre of the city, to the extent of their limits—Harlem river—at the expense of $1,100,000. It is undoubtedly the commencement of the *great work* of internal improvement, that is to connect this city with the great western lakes. It is to be the great artery that is to facilitate travel and trade at all seasons of the year, when the Hudson is bound in icy fetters, with the rich and prosperous towns and cities of the west.

The company invited was very numerous; consisting of the members of the court for the correction of errors—members of assembly and congress—members of the common council—chancellor Walworth—Judges Edwards, Jones, Oakley and Ingraham—Maj. Gen. M'Comb, Maj. Gen. Sandford, Brig. Gen. Morris—Ex-Mayors Bowne, Hone and Clark—Chevalier Gerstner, of Austria—besides a great number of our own most respectable citizens, and gentlemen of the press generally.

Samuel R. Brooks, Esq., president of the company, presided, assisted by William Paxon Hallet, Esq., and Ald. Greenfield, members of the board of directors.

The president, Mr. Brooks, made a most interesting statement of the progress and condition of the company, and the value and importance of similar works. He said in substance condensed:—

At this meeting to celebrate the completion of a double track of railway from the City Hall at the park to Harlem River, and which has been accomplished by individual enterprise, unaided by the funds of the State or the Nation, is an occasion in which men of all parties and shades of parties cannot fail to take deep interest.

However widely we may differ on other matters, here at least we can scarcely fail to be unanimous. On this day and on this occasion, all personal all political feelings are quelled; all strife of party is hushed: and we are incapable, I trust, said he, whatever our political opinions may be, of refusing to rejoice at the completion of a double track of railroad from the heart and center to the outer boundary of the great commercial capital of this great republic.

Although we have met to celebrate the successful works of the past, yet we must hope that it will tend to promote important results in relation to the works of the future, especially in giving a proper tone to public feelings,

and efficient patronage to the extension of this road, by the construction of the New York and Albany railroad.

In expressing this hope, I cannot, said Mr. B., but feel some degree of doubt as to its being realized, if we rely for the means of doing it on funds to be derived from England, by the sale of bonds of the State or company.

Our forefathers, in the early settlement of the country, had no other mode of communication with each other than that of a foot or bridle path, and what was their course of action under such circumstances? Why, gentlemen, their public spirit and patriotism induced them to turn out individually and not only give the land, but give their daily labor to convert the foot path into a good country road. This was done throughout the whole extent of our country, and by one united effort of all classes and conditions of men they had good roads constructed.

What, gentlemen, is the present mode of action on the introduction of railroads? Why, we see in numerous instances, they rely on foreign funds for their construction. Surely the modern railroad is as great an improvement on the turnpike, as the common road was on that of a foot-path. Why is it then, that we of the present day do not find the same generous spirit of individual contributions, of associations relying on their own means, and as freely offering them for the construction of this greatest of modern improvements, as were our forefathers in their gifts of land labor and money?

Why is it, that such a projected road as the New York and Albany railroad is deprived of the means of construction? I fear the answer will be found in the fact, that the public rely upon the sale of bonds in Europe to supply the necessary funds.

From present appear ances I fear the progress of events are not likely to restore or create confidence sufficient to afford our agents abroad the power of negotiating our securities at satisfactory prices. Hence the necessity of those who reside on the line of that wealthy tier of counties through which the New York and Albany railroad is projected, knowing and feeling, that if they expect the road to be constructed, they must rely upon their own means and ample resources for its successful completion.

The New York and Harlem railroad has been completed from the city hall to Harlem river by individual enterp ise, unaided by the bonds of the State or the Nation, and so can the Albany railroad be constructed. But if the public rely upon the sale of bonds in foreign markets for the necessary funds to construct the road, I fear they will rely upon that, which will prove but a broken reed.

Gentlemen, I ought to apologise for the time I have claimed your attention to these remarks, but hoping that they may prove useful in the real promotion of internal improvement, I forbear to detain you longer, and will proceed to announce to you the first regular toast which the committee of the board have prepared for the occasion.

After these remarks the president announced the regular tosts, which we omit, and add a few of the volunteers.

By the president.—*The New York and Albany railroad.* May it soon reach the St. Lawrence in the east, lake Erie in the west, Canada in the north, and the Mississippi in the south. Four cheers.

Charles Henry Hall, Esq., president of the road replied.

[We hope to present Mr. Hall's reply in our next number.—*Eds. Jour.*]

By Wm. Paxton Hallet, Esq.,—*The Empire State*— Interlaced with veins of iron, who shall put a limit to the development of her gigantic resourses?

By John V. Greenfield, 2nd vice presdent.—*The United States*—Linked together, not only by the ties of political friendship, but by bands of iron —May both ties and bands be equally indissoluble.

By Philip Hone.—*The Locomotive*—The only good motive for riding a man upon a rail.

By Thomas Sargent.—*Dr. Darwin and his prophecy*—Half a century before the accomplishment of the prediction, he wrote these lines:

"Soon shall thy power, unconquered steam! afar
Drag the swift barge, and speed the ponderous car."

By Jos. E. Bloomfield.—*Railroads*—The great desideratum—to bind the Union in an iron band of brothers. An improvement of the age, as important and necessary to connect all parts of the Union with their commercial centre, New York,—as steam packets furnish the facilities to unite us to England and the world.

By Isaac Gibson.—*Railroads throughout the world*—They have brought the great family of mankind into nearer and more genial communion—they have levelled old prejudices—created new affinities—and given a new impetus to the great cause of civilization. May their extent be unlimited.

By James R. Whiting.—*The memory of Robert Fulton.*—The smoke which our transatlantic steam ships leave behind them on the great deep, forms a wreathe for his fame prouder tha nthe laurels of theconqueror.

By Edwin Post,—*Our locomotive steam engines*—Who would transfer to acheing human shoulders the burthens so easily borne by those "patient metallic laborers."

By Silas M. Stilwell.—*The travelling community*—Their increase is in proportion to the increase of facilities for locomotion, and the more numerous they are, the more numerous will be the friends of the Union.

By Heman W. Childs.—*Evans, Perkins and Watt*—To their improvements and inventions we owe the availability of the steam engine for our railroads—may the obligation be ever gratefully remembered.

By Mr. M'Elrath.—*The New York and Harlem railroad*—Uniting the extremes of the city of New York into one common ward; equalizing property over the whole island; affording healthful abodes to the industrious and frugal, in place of miserable habitations in the narrow and impure streets of the lower wards. It is at once the poor man's carriage and the working man's hackney coach.

ELECTRO-MAGNETIC NAVIGATION.—Mr. Faraday recently received a letter from M. H. Jacobi, dated St. Petersburgh, on the application of electro-magnetism to navigation; Mr. Faraday has caused it to be inserted in the *London and Edinburgh Philosophical Magazine* for the current month. The following is a short extract from this curious paper:—"In the application of electro-magnetism to the movement of machines, the most important obstacle always has been the embarassment and difficult manipulation of the battery. This obstacle exists no longer. During the autumn of 1838, and at a season [in 1839] already too advanced, I made as you will have learned by the *Gazettes*, the first experiments in navigation on the Neva, with a ten-oared shallop, furnished with paddle wheels, which were put in motion by an electro-magnetic machine. Although we voyaged during entire days, and usualy with ten or twelve persons on board, I was not well satisfied with this first trial, for there were so many faults of construction, and want of insulation in the machines and battery, which could not be repaired on the spot, that I was terribly annoyed. All those repairs and important changes being accomplished, the experimenents will shortly be recommenced. The experience of the past year, combined with the recent improvements of the battery, give us the result, that to produce the force of one horse (steam engine estimation,) it will require a battery of 20 square feet of platina distributed in a convenient manner, but I

hope that eight to ten square feet will produce the effect. If Heaven preserves my health, which is a little effected by continual labor, I hope by next midsummer I shall have equiped an electro-magnectic vessel of from 40 to 50 horse-power!"—*Eng. Paper.*

Table of the Mean Temperature of the years 1833, 1834, 1835, 1836, 1837, and 1838; the extreme coldest and hotest day in each year; and the number of days that was clear, cloudy, rainy, white frost, foggy morning, snow, hail or sleet.

Years.	Mean temp. of each year				Thermometer, the extreme in each year.				Number of days in each year, that was either						
	Morn.	Noon	Night	of the Year.	Date.	low'st	Date.	high't	Clear	Cl'dy	Rainy	White Frost	foggy Morn.	Snow	hail or Sleet.
1833	60	73	68	67	Nov. 26th	25	July 29th	93	230	135	72	22	7		
1834	60	73	67	67	Jan. 5	16	Aug. 20	92	202	163	101	19	18	3	3
1835	58	71	67	65	Feb. 8	12	July 29	89	221	144	93	25	14	2	2
1836	59	72	65	65	Dec. 21	19	July 23	93	229	137	84	36	5		1
1837	59	71	67	66	Jan. 15	24	June 2	91	229	136	71	27	16	1	1
1838	59	70	65	66	Feb. 16	12	June 25	94	248	117	72	35	7		3
Aver. six years.	59	72	67	66					226	139	82	27	11	1	2

Table of the *average* of the Mean Temperature, taking each of the months together, for the years of 1833, '34, '35, '36, '37, and '38; also, the average of the number of days for each of the months of the six years, that was clear, cloudy, rainy, white frost, foggy morning, snow, hail or sleet.

	Aver. mean temp. for six years.				Average of each month for six years together.							Remarks.
	Morn.	Noon	Night	M'nth	Clear	Cl'dy	Rainy	White Frost	foggy Morn.	Snow	hail or Sleet.	
January,	45	57	53	52	16	15	9	4	1	1	1	
February,	44	58	54	52	15	13	6	6	1		1	
March,	52	65	60	59	16	15	7	3				
April,	60	73	67	67	19	11	7		1			
May,	66	78	73	72	20	11	8					
June,	73	85	80	79	23	7	5		1			
July,	74	86	80	80	21	10	9		1			
August,	73	86	81	80	20	11	7		1			
September,	68	81	75	75	18	12	8					
October,	58	71	66	66	21	10	5	1	1			
November,	48	62	59	56	21	9	5	5	2			
December,	44	57	53	51	16	15	5	8	2			
Aver. a year.	59	72	67	66	226	139	81	27	11	1	2	

Oswego and Syracuse Railroad.—A scientific examination of the route for a railroad from this village to Syracuse, is now in progress by an engineers corps, under the direction of Mr. C. B. Stuart, who was the able and efficient resident engineer on the Utica and Syracuse railroad from its commencement to its completion. The engineers will examine several routes, and report in relation to such as appear feasible. They have now been one week engaged in the survey, and we learn that the ground thus far is considered favorable. The result of these examinations, it is expected, will be given to the public before the opening of the books for subscriptions to the stock of the company in October next. From the reputation of the engineers engaged, and the success which has attended their labors on the Utica and Syracuse railroad, the public will have a guarantee that their report can be relied upon with the utmost confidence.—*Oswego Pal.*